

COMPLETE LISTING OF THE CLAIMS

The following lists all of the claims that are or were in the above-identified patent application. The status identifiers respectively provided in parentheses following the claim numbers indicate the current statuses of the claims.

1. (Original) A device comprising:

a first magnetic region;

a second magnetic region;

a control region that forms a first interface with the first magnetic region and a second interface with the second magnetic region; and

a wire positioned relative to the control region so that a current through the wire creates in the control region a magnetic field that rotates spins of the electrons traversing the control region.

2. (Original) The device of claim 1, wherein the control region is such that an electron spin relaxation time of the control region is longer than a transit time of the electrons traversing control region.

3. (Original) The device of claim 1, wherein the control region comprises a semiconductor material.

4. (Original) The device of claim 3, wherein the semiconductor material is selected from a group consisting of Si, Ge, GaAs, InAs, GaP, GaInAs, ZnSe, and ZnCdSe.

5. (Original) The device of claim 3, wherein the semiconductor material is n-type.

6. (Original) The device of claim 1, wherein each of the first and second magnetic regions comprises a ferromagnetic material.

7. (Original) The device of claim 1, wherein the first magnetic region has a first magnetization, the second magnetic region has a second magnetization, and the first and second magnetizations are fixed at a relative angle selected to give the device a desired electrical characteristic.

8. (Original) The device of claim 1, further comprising terminals that permit

biasing of the first and second magnetic regions to cause injection of spin-polarized electrons through the first interface into the control region so that the second interface acts as a spin filter with a resistance depending on spin orientation of the spin-polarized electrons in the control region, near the second interface.

9. (Original) The device of claim 1, wherein a bias voltage applied between the first and second magnetic regions causes injection of spin-polarized electrons through the control region between the first magnetic region and the second magnetic region.

10. (Previously Presented) The device of claim 1, wherein a fixed bias voltage is applied between the first and second magnetic regions, and a first current through the wire changes a second current between the first and second magnetic regions.

11. (Original) The device of claim 1, further comprising an insulating material disposed to electrically insulate the wire from the control region, the first magnetic region, and the second magnetic region.

12. (Previously Presented) A device comprising:
a magnetic wire;
a magnetic region; and
a control region forming a first interface with the magnetic wire and a second interface with the magnetic region, wherein:

the first and second interfaces selectively permit spin-polarized electrons to cross between the magnetic wire and the magnetic region; and

a current along the magnetic wire creates in the control region a magnetic field that rotates spins of the electrons traversing the control region to flow between the magnetic region and the magnetic wire.

13. (Original) The device of claim 12, wherein the control region is such that an electron spin relaxation time of the control region is longer than a transit time of the electrons traversing control region.

14. (Original) The device of claim 12, wherein the control region comprises a semiconductor material.

15. (Original) The device of claim 14, wherein the semiconductor material is selected from a group consisting of Si, Ge, GaAs, InAs, InP, GaInAs, ZnSe, and ZnCdSe.

16. (Original) The device of claim 14, wherein the semiconductor material is n-type.

17. (Original) The device of claim 12, wherein the magnetic wire comprises a ferromagnetic material.

18. (Original) The device of claim 12, wherein the magnetic region comprises a ferromagnetic material.

19. (Original) The device of claim 12, wherein the magnetic wire has a first magnetization, the magnetic region has a second magnetization, and the first and second magnetizations are fixed at a relative angle selected to give the device a desired electrical characteristic.

20. (Original) The device of claim 12, wherein a bias voltage applied between the magnetic wire and the magnetic region causes injection of spin-polarized electrons through the control region between the magnetic wire and the magnetic region.

21. (Original) The device of claim 12, wherein a fixed bias voltage is applied between the magnetic wire and the magnetic region, and a first current through the magnetic wire changes a second current between the magnetic wire and the magnetic region.

Claims 22 to 38 (Canceled)

39. (Previously Presented) The device of claim 12, further comprising a first and second contacts connected to opposite ends of the magnetic wire, wherein the current along the wire flows between the first and second contacts.

40. (Previously Presented) The device of claim 1, further comprising a first and second contacts connected to opposite ends of the wire, wherein the current creating the magnetic field flows between the first and second contacts.